

**REMARKS**

**I. Amendments**

The foregoing Amendments to the Claims section are submitted to correct the non-compliant amendment submitted on January 9, 2006. The Examiner brought to Applicants' attention, in the Notice dated April 7, 2006, that the period in Claims 10 and 13 should not have been underlined and that the semicolon in Claim 13 should be underlined. Applications have made these changes and the amended claims now contain the appropriate markings. Also, for the convenience of the Examiner, Applicants submit the remainder of the Amendment that was filed on January 9, 2006, including amended drawings and remarks.

Prior to this amendment, Claims 10-22 and 33-42 were pending. Claims 34-39 and 42 were withdrawn from consideration. In the last Office Action, the Examiner rejected Claims 10-22, 33, 40, and 41. By this amendment, Applicants cancel Claims 40 and 41, amend Claims 10, 13, and 15, and add new Claims 43 and 44. The new claims and amendments to the existing claims do not add new matter. Claims 10-22, 33-39, and 42-44 are now pending. Claims 10-22, 33 and 43-44 are under examination.

A clearer version of the Western blot images represented in Substitute Sheet Fig. 8 is included as an Amendment to the Drawings and is submitted as Replacement Sheet Fig. 8. Applicants added the label, "Core mab," below the Western blot pictured in the right panel of Figure 8 to represent that monoclonal antibodies against core protein were the type of antibody used. Support for this amendment can be found in the Specification at page 13, lines 6-8. The other minor changes made to Substitute Sheet Fig. 8 is that the lane markers and antibody labels of the two left panels of Figure 8

were switched in position as indicated in the annotated copy of Replacement Sheet

Fig. 8.

## II. Rejection under 35 U.S.C. § 112, ¶2

The Examiner rejected Claims 10-22 under 35 U.S.C. § 112, second paragraph, as being “indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.” (Office Action at 4.) The Examiner stated that Claims 13-16 and 20-22 ultimately depend from cancelled claims and that their scope cannot be determined. (*Id.* at 5.) Applicants have amended Claims 13 and 15 to include the limitations of the cancelled claims from which they originally depended. In view of this amendment, Claims 14, 16, and 20-22 no longer depend from cancelled claims. Applicants submit that the foregoing amendments to Claims 13 and 15 obviate the Examiner’s rejection of claims 13-16 and 20-22.

The Examiner also rejected Claims 10-22 under 35 U.S.C. § 112, second paragraph, finding that it is not clear what types or degrees of variation are intended to be encompassed within the scope of “allelic variant” and “homolog” of core+1 polypeptide of Claim 10 and the mutants of Claims 15 and 16. (*Id.* at 4-5.) The Examiner further rejected Claims 17-22 as necessarily being indefinite since Claims 17-22 are directed toward purified antibodies of the polypeptides of the rejected Claims. (*Id.* at 5.) Applicants respectfully traverse this ground of rejection and request reconsideration.

Applicants have amended Claims 10 and 15 to include language supported by the specification. Particularly, Claim 10 now recites, “a variant of core+1 polypeptide, wherein the amino acid sequence of the variant shares at least 80% identity with a

native core+1 polypeptide amino acid sequence,” and Claim 15 now recites, “wherein the amino acid sequence of the resulting mutant variant shares at least 80% identity with a native core+1 polypeptide amino acid sequence.” Applicants also present new Claims 43 and 44, which recite that the variant “shares at least 90% identity with a native core+1 polypeptide amino acid sequence.” Support for these amendments and new Claims 43 and 44 can be found in the specification at page 20, lines 18-21.

In view of the amendments to Claims 10 and 15, Applicants assert that Claims 10-22 are definite within the meaning of U.S.C. §112, second paragraph. Applicants respectfully request that the rejection of Claims 10-22 under 35 U.S.C. § 112, second paragraph, be withdrawn.

### **III. Rejection under 35 U.S.C. § 112, ¶1**

The Examiner rejected claims 10-14 and 16-22 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner emphasized that the potential genus of “allelic variant[s]” and “homolog[s]” of core+1 polypeptide as used in Claim 10 and its dependent claims and the mutants of Claims 15 and 16 is too vast. (*Id.* at 2.) The Examiner stated that “[n]o information regarding the effects of such structural variation or modification on the function of the polypeptide is set forth either in the specification or in the prior art. The relationship of structure of polypeptides to their function is and was insufficiently developed in the art to permit *a priori* knowledge of at least a representative sample of such variant structures that would retain the disclosed function.” (*Id.* at 2-3.) The Examiner further rejected Claims 17-22, which are directed toward purified antibodies to the claimed polypeptides, as necessarily failing for lack of written description as well. (*Id.* at 3.)

Applicants respectfully disagree with the Examiner's rejection and assert that the specification does provide information regarding a representative sample of structural variations of the core+1 polypeptide and how these variants retained the disclosed function. The specification describes five different variations of the core+1 polypeptide, namely Mut R1, Mut R2, Mut R3, Mut R4, and Mut R5. (Specification at page 47, lines 1-17.) Like the core+1 polypeptide, each of the variants of the core+1 polypeptide is expressed as a polypeptide and each variant polypeptide is detectable by Western analysis using HCV-positive human serum and monoclonal antibody against core protein. (Specification at page 47, lines 18-26; page 13, lines 3-16; and Substitute Sheet Fig. 8.)

The ability of variants of the core+1 polypeptide to bind polyclonal anti-HCV antibodies and monoclonal anti-core antibodies is a protein function that is important to some embodiments of the present invention. For example, variants of the core+1 polypeptide are contemplated as useful diagnostic tools for the detection of the presence or the absence of antibodies. Therefore, the Applicants assert that the specification does disclose a sufficient representative sample of variant structures that retain important functions of the core+1 polypeptide.

Applicants have amended Claims 10 and 15 to include language supported by the specification of the present invention. Particularly, Claim 10 now recites, "wherein the variant is detectable by Western analysis using HCV-positive human serum or monoclonal antibody against core protein," and Claim 15 now recites, "wherein the resulting mutant variant of core+1 polypeptide is detectable by Western analysis using HCV-positive human serum or monoclonal antibody against core protein." Support for

these amendments can be found in the specification at page 47, lines 18-26; page 13, lines 3-16; and Substitute Sheet Fig. 8.

In view of the foregoing arguments and the amendments to Claims 10 and 15, Applicants assert that Claim 10 and 15, Claims 11-12, 17-18, and 43, which depend from Claim 10, and Claims 16, 21-22, and 44, which depend from Claim 15, comply with the written description requirement. Applicants respectfully request that the rejection of Claims 10-14 and 16-22 under 35 U.S.C. § 112, first paragraph, be withdrawn.

The Examiner also rejected Claims 40 and 41 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. (*Id.* at 3.) Applicants have canceled Claims 40 and 41, thereby obviating the Examiner's rejection. Applicants assert that the cancellation of Claims 40 and 41 does not signify that Applicants agree with the Examiner's rejection. Applicants respectfully request that the rejection of Claims 40 and 41 under 35 U.S.C. § 112, first paragraph, be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account 06-0916.

Respectfully submitted,

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**Attachments:** **Replacement Sheet Fig. 8 and  
Annotated Copy showing changes**

**AMENDMENTS TO THE DRAWINGS:**

The attached Replacement Sheet Fig. 8 includes clearer images of the Western blots represented in Substitute Sheet Fig. 8. Applicants added the label, "Core mab," below the Western blot pictured in the right panel of Figure 8 to describe the type of antibody used. The lane markers and antibody labels of the two left panels of Figure 8 were switched in position and the two instances where "LANES:" was used were removed as indicated in the annotated copy of Replacement Sheet Fig 8.

Attachments:      Replacement Sheet Fig. 8  
                        Annotated copy showing changes.

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FIG. 8

ANNOTATED SHEET

